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Notice of Allowability	Application No.	Applicant(s)	
	10/713,107	BEADLE ET AL.	
	Examiner	Art Unit	
	Douglas N. Washburn	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to filing of 18 February 2004.
2. ☒ The allowed claim(s) is/are 1-28.
3. ☒ The drawings filed on 17 November 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☒ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

DETAILED ACTION
EXAMINER'S COMMENT

Information Disclosure Statement

1 The information disclosure statement filed 18 February 2004 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because applicant **failed to provide copies of each publication or that portion which caused it to be listed**. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1). **Use of form PTO-1449, "Information Disclosure Citation," or PTO/SB/08A and 08B, "Information Disclosure Statement," is encouraged as a means to provide the required list of information as set forth in 37 CFR1.98(a)(1).**

Oath/Declaration

2 The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because: It does not identify the citizenship of each inventor.

Prior Art Cited

3 Torkkola (US 5, 959,966) teaches multiple digital radio signals transmitted simultaneously at the same frequency are separated and source signals recovered using blind source separation (BSS) techniques. BSS based processes are applied to baseband signals prior to demodulation to recover source signals. A probability density function (PDF) model of the baseband source signal is generated and an adaptation equation produced. A separation matrix is constructed by applying an adaptation equation to the baseband signals to recover source signals. Torkkola is silent regarding generating a hybrid separation matrix as a function of time differences between receipt of M signals by N elements; forming a separation matrix with hybrid minimum mean squared error weights, the weights generated as a function of a spatial correlation matrix; separation matrix is a function of a spatial correlation matrix of an unknown signal, a steering vector, and a spatial fourth order cumulant matrix pencil of the unknown signal and at least one interferer signal.

Dishman et al. (US 6,711,528) teaches statistically independent signals with low signal-to-noise plus interference ratios under a narrowband assumption utilizes cumulants in conjunction with spectral estimation of a signal subspace to perform blind source separation (BSS). The BSS technique utilizes a higher-order statistical method, specifically fourth-order cumulants, with the generalized eigen analysis of a matrix-pencil to blindly separate a linear mixture of unknown, statistically independent, stationary narrowband signals at a low signal-to-noise plus interference ratio having the capability to separate signals in spatially and/or temporally correlated Gaussian noise. Dishman is silent regarding generating a hybrid separation matrix as a function of time differences between receipt of M signals by N elements; forming a separation matrix with hybrid minimum mean squared error weights, the weights generated as a function of a spatial correlation matrix; separation matrix is a function of a spatial correlation matrix of an unknown signal, a steering vector, and a spatial fourth order cumulant matrix pencil of the unknown signal and at least one interferer signal.

Gustafsson (US 6, 845, 164) teaches a device and method for separating a mixture of source signals to regain the source signals, based on measured signals. The method comprises bringing each measured signal to a separation structure including an adaptive filter; using a generalized criterion function for obtaining filter coefficients, using cross correlation functions and a weighting matrix, the cross correlation functions being dependent on the filter coefficients; estimating the filter coefficients, the resulting estimates of the filter coefficients corresponding to a minimum value of the generalized criterion function; and updating the adaptive filter with the filter coefficients. Gustafsson is silent regarding generating a hybrid separation matrix as a function of time differences between receipt of M signals by N elements; forming a separation matrix with hybrid minimum mean squared error weights, the weights generated as a function of a spatial correlation matrix; separation matrix is a function of a spatial correlation matrix of an unknown signal, a steering vector, and a spatial fourth order cumulant matrix pencil of the unknown signal and at least one interferer signal.

Allowable Subject Matter

4 The following is an examiner's statement of reasons for allowance:

Claim 1 recites, in part, "generating a hybrid separation matrix as a function of time differences between receipt of said M signals by said N elements". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claims 2-7 depend from claim 1.

Claim 8 recites, in part, "a first code segment for causing said processor to generate a hybrid separation matrix as a function of time differences between receipt of said M signals by said N elements". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claims 9-14 depend from claim 8.

Claim 15 recites, in part, "a signal processor for receiving said received signals, generating a hybrid separation matrix, and multiplying said separation matrix by a time series matrix representation of said received signals". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claims 16-21 depend from claim 15.

Claim 22 recites, in part, "forming the separation matrix with hybrid minimum mean squared error weights, wherein said weights are generated as a function of a spatial correlation matrix". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claims 23 and 24 depend from claim 22.

Claim 25 recites, in part, "the separation matrix is a function of the spatial correlation matrix of the unknown signal, a steering vector, and a spatial fourth order cumulant matrix pencil of the unknown signal and the at least one interferer signal". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claims 26-28 depend from claim 25.

It is these limitations, which are not found, taught or suggested in the prior art of record, and are recited in the claimed combination that makes these claims allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion


5 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas N. Washburn whose telephone number is (571) 272-2284. The examiner can normally be reached on Monday through Thursday 6:30 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DNW



MICHAEL NGHIEM
PRIMARY EXAMINER

3/14/05